

**THREE NEW SPECIES OF *PHYLLOPHAGA* (*S. STR.*)
GROUP *ROSTRIPYGA*
(COLEOPTERA: MELOLONTHIDAE, MELOLONTHINAE)
FROM MEXICO AND GUATEMALA**

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Abstract.—New species of *Phyllophaga* (*sensu stricto*) are described from Mexican and Guatemalan localities as follows: *Phyllophaga jovelana* NEW SPECIES from northern mountains of Chiapas; *Phyllophaga serratipes* NEW SPECIES and *Phyllophaga serrana* NEW SPECIES from the mountains of Baja Verapaz and Zacapa. These species are living in isolated pine-oak or cloud forests located between 1450 and 2600 m altitude. Drawings of male genital capsules, female genital plates, tarsal claws and tibiae are provided.

Key Words.—Insecta, May beetles, *Phyllophaga*, taxonomy, mountains, Chiapas, Guatemala.

Resumen.—Se describen tres especies nuevas de *Phyllophaga* (*sensu stricto*) grupo *rostripyga*, procedentes de siete localidades en México y Guatemala. *Phyllophaga jovelana* NEW SPECIES de las montañas del norte de Chiapas, *Phyllophaga serratipes* NEW SPECIES de Zacapa, y *Phyllophaga serrana* NEW SPECIES de Baja Verapaz. Estas especies habitan en bosques mixtos de pinos y encinos o en bosques nebulares aislados, situados entre los 1450 y 2600 m de altitud. Se incluyen ilustraciones de las cápsulas genitales masculinas, de las placas genitales femeninas, de las uñas tarsales y de las tibias.

In 1990, one of us (MAM) found specimens of one exceptional undescribed species of *Phyllophaga* from northern Chiapas deposited in Canadian collections. Meso- and metatibial structure, as well as genital capsule shape and accessories were very different from the groups proposed by Morón (1986). Other specimens with similar characters were found by E. Cano during 1991–1992 collection trips to different montane areas in Guatemala. Study and comparisons of these new specimens and the types of Mesoamerican species described by Bates (1888) and Saylor (1940) reveal that the new specimens represent a different group of species, named group “*rostripyga*” and tentatively placed between groups “*schizorhina*” and “*blanchardi*”. The *rostripyga* group is formed by six described species and two undescribed species from Guatemala (Cano & Morón 1998). Recent collections (1997–1999) in the mountains of Chiapas, Guatemala and Honduras have provided a number of specimens that represent more undescribed species of the “*rostripyga*” group, but unfortunately many of these are isolated males or females. Because these species fly only during a short period each year, and the collection of representative samples is sporadic or scarce, it is better to describe the new species represented by short series of both sexes before completing the revision of the new group. This paper describes males, females, variation and gives the precise distribution of three new species of *Phyllophaga* (*s. str.*) group *rostripyga*. The characters and terms used in the descriptions are those of Sanderson (1958) and Morón (1986). Drawings were made with the aid of a camera

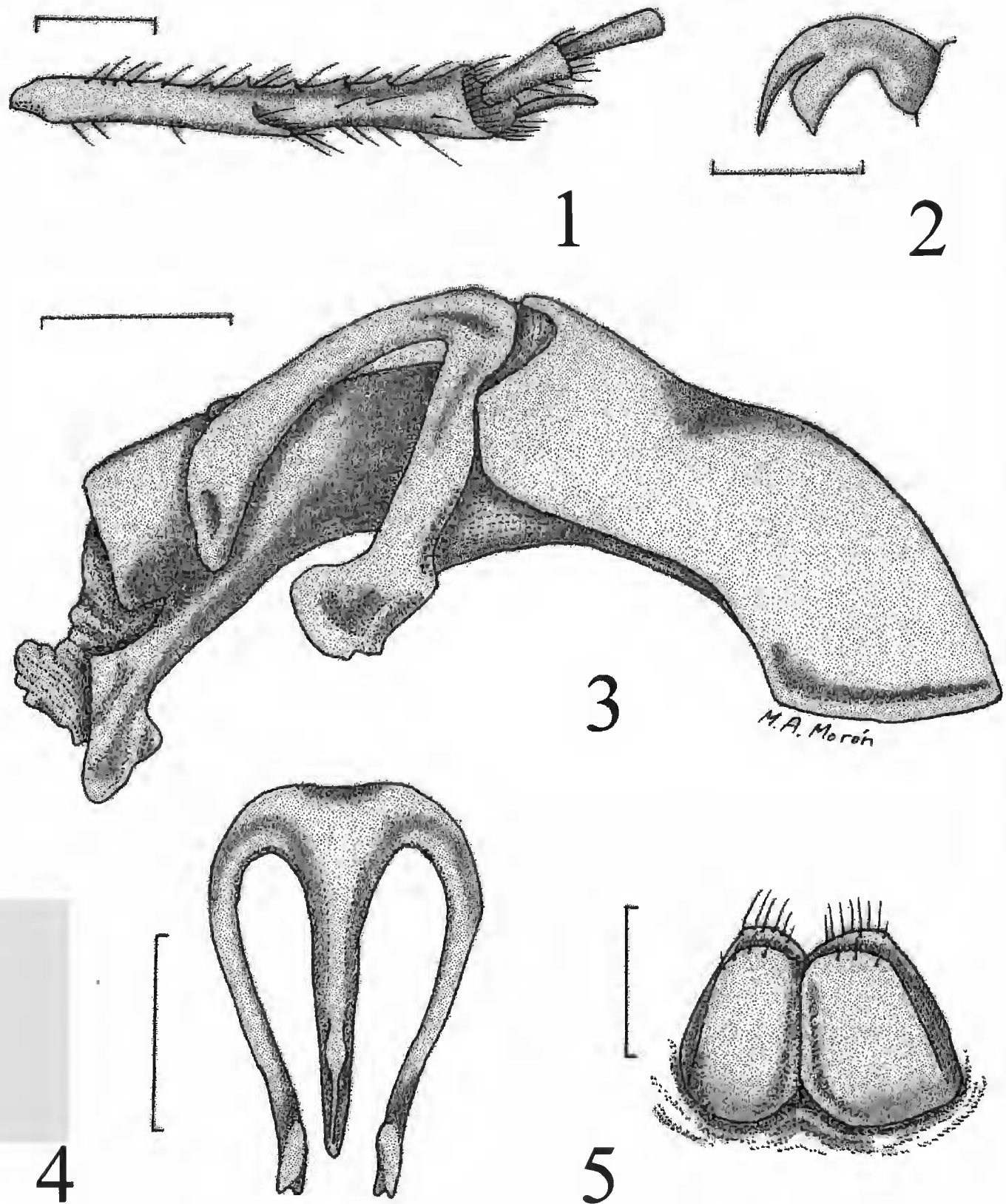
lucida and Leica stereomicroscope; measurements were obtained with ocular micrometer or caliper.

Depository Abbreviations.—California Academy of Sciences, San Francisco (CASC); Canadian National Collection, Ottawa (CNC); University of Nebraska State Museum, Lincoln Nebraska (UNSM); Universidad del Valle de Guatemala (UVGC); A & H. Howden/Canadian Museum of Nature, Ottawa (AHHC); and M.A. Morón (MXAL) Xalapa, México.

PHYLLOPHAGA (PHYLLOPHAGA) JOVELANA MORÓN & CANO, NEW SPECIES
(Figs. 1–5)

Types.—(described from 8 males and 2 females). Holotype, male; MEXICO. CHIAPAS: 12 km NE San Cristóbal de las Casas, 17 May 1969, H. F. Howden; deposited: A. & H. Howden/Canadian Museum of Nature, Ottawa. Allotype, female; MEXICO. CHIAPAS: 6 km E San Cristóbal de las Casas, 26 May 1969, D. E. Bright; deposited: M.A. Morón collection, Xalapa. Paratypes: same data as holotype except 9 May 1969 (1 male) (HAHC); same except 28 May 1969 (1 female) (CNC); same except 29 May 1969 (1 male) (MXAL); same data as allotype (1 male) (CNC); 15 km E San Cristóbal de las Casas, 10/14 Sep 1985, B. C. Ratcliffe & C. Messenger (1 male) (UNSC); Chiapas, Lago Montebello, 15 Jun 1985, D. Thomas & J. Mackley (1 male) (MXAL); Chiapas, 13.5 km N Teopisca or Pan Am. Hwy, 31 May 1987, uv light, W. B. Warner (1 male) (MXAL); 10 km SE San Cristóbal de las Casas, 31 May 1987, B. Ratcliffe & M. Jameson (2 males) (UNSC, UVG).

Holotype.—Male. Head, pronotum and elytra shiny reddish dark brown, sterna, pygidium and legs shiny yellowish brown. Clypeus wider than long (4.5:1), anterior border briefly sinuated with margins scarcely elevated, surface nearly flattened, with some shallow, circular punctures, and scarce erect setae. Fronto-clypeal suture slightly sinuated, clearly impressed. Frons wider than long (1.7:1) convex, rugo-punctate, with long, slender setae. Antenna 10 segmented, with 3 segmented club; lamellae as long as the length of the five preceding segments combined, segments 4° or 5° longer than segment 3, segment 7° wider than long, with acute process directed forward. Frons 6.5× wider than each eye dorsal diameter. Canthus short, curved and rounded, with 5 setae. Labrum deeply bilobed, with curved slender setae on the borders. Mentum widely concave, polished, with lateral slender setae, anterior border briefly notched. Pronotum wider than long (1.8:1) and 2× wider than frons. Pronotal disk with round, deep, large punctures irregularly dispersed separated by 1–5 diameters, with scattered long, slender setae only at the anterior border; lateral borders strongly angulated, marginal bead finely crenulate, with long, slender setae; anterior angles obtuse, rounded; posterior angles obtuse, slightly directed downward. Scutellum 1.5× wider than long, with 6 diminute punctures. Elytron 2.2× longer than wide, densely rugo-punctate, with some erect, long setae on the apical half of the sutural striae; epipleural border narrowed, extended along the complete margin, provided with a fringe of mixed long and short setae; humeral calla rounded, prominent; apical calla rounded. Metathoracic wings completely developed. Propygidium shiny, fine and sparsely punctate with short setae toward the basal sides. Pygidium convex, shiny, rugose, sparse and shallowly punctate, glabrous; apical margin with 22 slender setae; basal margin effaced at the middle. Pterosternon with long, dense, yellowish vestiture. Visible abdominal sternites 2° to 4° nearly convex at the midline, sternite 5° convex, with vague patch of microscopic granules and setae; anal plate slightly convex, sparse punctate, with anterior and posterior borders not thickened, but with shallow mesial fallow, and 8 scattered setae near the posterior border. Protibiae shorter than protarsi (1:1.2), with two big teeth and one small tooth on external border, preapical spur long, straight, acute, slightly longer than 2° protarsomerus. Mesotibiae with one oblique, strong, setiferous, transverse carina across external side, and one row of 7 short spines along dorsal border; upper apical spur nearly straight, narrow, 0.9× shorter than lower spur. Metatibiae nearly as long as metatarsi (1:1.1), with one oblique, strong setiferous transverse carina across external side, and one row of 6 short spines along dorsal border (Fig. 1); apical spurs articulated with the



Figures 1–5. *Phyllophaga jovelana* NEW SPECIES.

Figure 1. Lateral view of male metatibia.

Figure 2. Male protarsal claw.

Figure 3. Lateral view of complete genital capsule of holotype.

Figure 4. Distal view of same paramera.

Figure 5. Female genital plates of allotype. Scale lines = 1 mm, except figure 2 = 0.5 mm.

border, upper spur narrowed with rounded apex, slightly curved, nearly as long as 2° metatarsomeres, and 1.2× longer than the lower spur. Tarsomeres semicylindrical, elongated, with enlarged apex, some setae around the apex and two lines of some setae ventrally. Tarsal claws symmetrical, similar on all legs, with median, curvate acute teeth located toward the apex (Fig. 2). Genital capsule with long paramera, fused at their basis, apex widened and compressed, with a long unpaired structure fixed at the middle of the basis. Tectum convex. Aedeagus long, with wide sclerotized tube-like support (Figs. 3 and 4). Length of genital capsule from the apex of parameres to the border of basal piece: 3.8 mm. Total body length: 14.2 mm. Humeral width: 6.1 mm.

Allotype.—Female. Similar to the male except as follows: clypeus and frons slightly more rugose;

antennal club as long as the preceding four segments; elytra without long setae on the sutural striae; pygidial shape more triangular, with vague carina along middle line, and the apex projected; visible abdominal sternite 5° convex, with scattered setiferous punctures; anal plate convex, punctate, with 10 slender setae near the posterior border. Spines on the dorsal border of meso- and métatibia are larger than in the male. Apical spurs of metatibiae more wide and curved than in the male, with rounded apices. Ventral genital plates strongly sclerotized, nearly symmetrical, convex, smooth, with 3–4 short slender setae near the posterior border; dorsal genital plates fused, with wide, rounded distal borders provided with 6–7 setae on each side (Fig. 5). Total body length: 14.9 mm. Humeral width: 6.6 mm.

Type locality.—Volcano Tzontehuitz, San Cristóbal de las Casas, state of Chiapas, México (approx. 16°50' N; 92°35' W).

Variation.—Male paratypes are similar to the holotype except as follows: body color dark reddish brown to light reddish brown; pronotal borders with more or less number of erect, long setae; pygidium with more or less rugose-punctate; total body length: 12.6–15.2 mm, humeral width: 5.0–6.2 mm. Female paratype are similar to the allotype except as follows: elytra with long setae on the apical half of sutural striae; total body length: 14.2 mm; humeral width: 6.1 mm

Biological Data.—Specimens of *P. jovelana* were collected at lights in pine and oak forests located from 2400 to 2600 m altitude. Phenology: May (6), June (1), September (1). Other species of *Phyllophaga* flying at the same time were *P. (Phytalus) senicula* (Bates), *P. (s. str.) chamula* Morón, *P. (s. str.) tojolabala* Morón and *P. (Chlaenobia) ratcliffeiana* Morón.

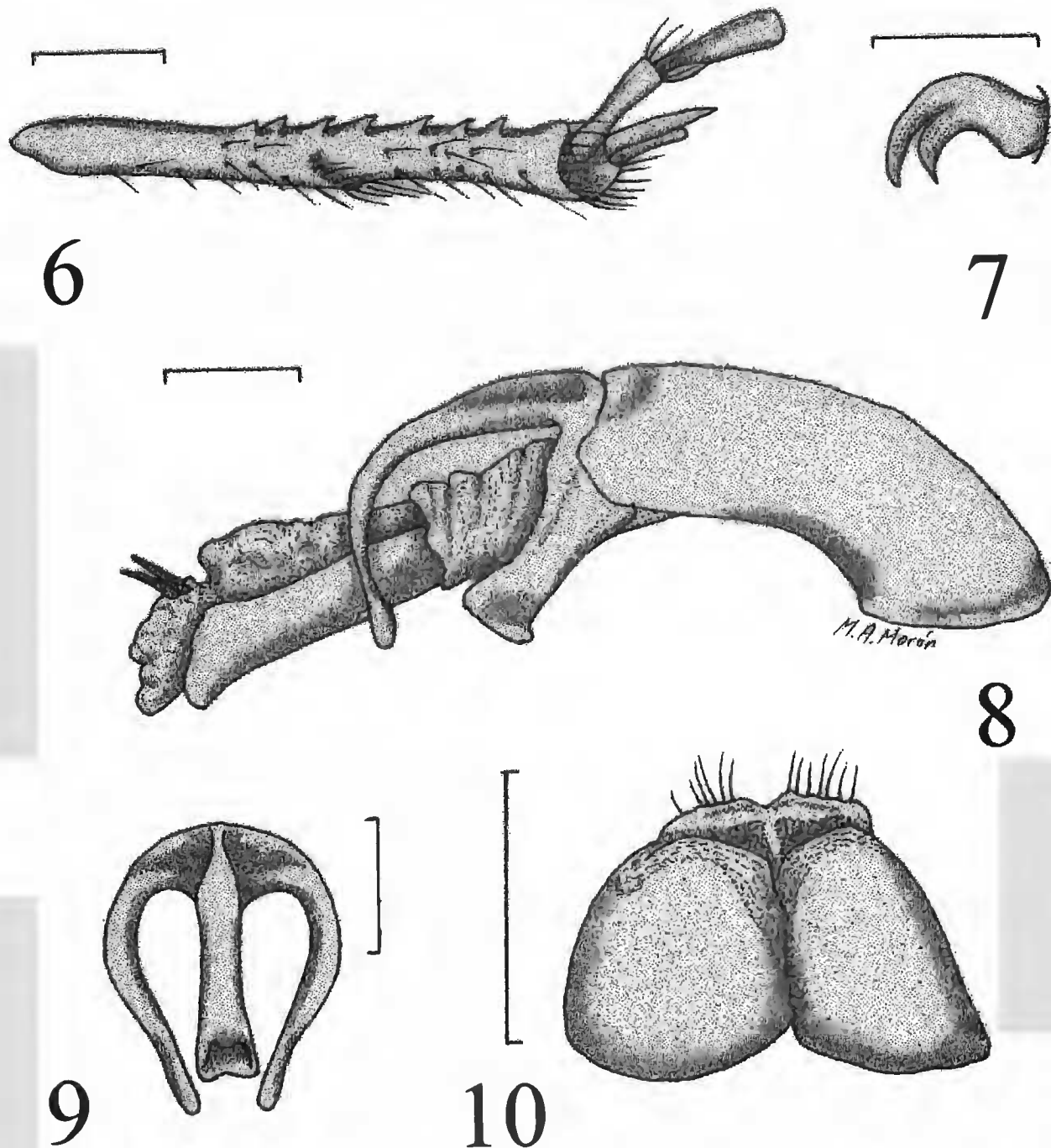
Remarks.—*Phyllophaga jovelana* is included in the species group *rostripyga* (*sensu* Cano & Morón 1998), and is related to *P. abcea* Saylor and *P. serrana* sp. nov. Shape of clypeus, sculpture of pygidium and last abdominal segments, structure of paramera and aedeagus aid to separate from allied species.

Etymology.—Derived from the old indigenous Maya Tzeltal name of the place where the city of San Cristobal de las Casas was founded, “*Jovel*” meaning “place where the grass growth in bundles” (Manuel Girón, personal communication).

PHYLLOPHAGA (PHYLLOPHAGA) SERRATIPES MORÓN & CANO, NEW SPECIES
(Figs. 6–10)

Types.—(Described from 9 males and 3 females. Holotype, male; GUATEMALA. ZACAPA, arriba de La Unión, 26 Sep 1992, R. Villatoro; deposited: Universidad del Valle de Guatemala collection. Allotype female; same data as holotype; deposited: Universidad del Valle de Guatemala collection. Paratypes. Same data as holotype (4 males) (MXAL; UVGC); same data as holotype except 26 Jun 1992, H. Castañeda (2 males) (UVGC); same data except 1 May 1992 (1 male, 1 female) (UVGC); same data except 14 Jul 1993, J. Monzón (3 males, 1 female) (UVGC; MXAL; CASC).

Holotype.—Male. Head, pronotum and elytra shiny reddish dark brown, nearly black, sterna, pygidium and legs shiny reddish brown. Clypeus wider than long (4.8:1), anterior border widely sinuated with margins scarcely elevated, surface slightly convex, with deep, circular punctures, and scarce erect setae. Fronto-clypeal suture slightly sinuated, clearly impressed. Frons wider than long (1.8:1) convex, with wide, shallow, rounded punctures of different diameters, and some long, slender setae. Antenna 10 segmented, with 3 segmented club; lamellae as long as the length of the five preceding segments combined, segments 4° equal to segment 3°, segment 5° slightly shorter than segment 3°, segments 6° and 7° wider than long, with rounded process directed forward. Frons 6.8× wider than each eye dorsal diameter. Canthus narrowed, curved and rounded, with 7 setae. Labrum deeply bilobed, with scarce



Figures 6–10 *Phyllophaga serratipes* NEW SPECIES.

Figure 6. Lateral view of male metatibia.

Figure 7. Male protarsal claw.

Figure 8. Lateral view of complete genital capsule of holotype.

Figure 9. Distal view of the paramera of paratype.

Figure 10. Female genital plates of allotype. Scale lines = 1 mm, except figure 7 = 0.5 mm.

slender setae on the borders. Mentum widely concave, polished, with lateral slender setae, anterior border widely notched. Pronotum wider than long (1.8:1) and 2.3× wider than frons. Pronotal disk with rounded, deep, large punctures of different diameters irregularly dispersed, separated by 1–4 diameters, without macroscopic setae; lateral borders strongly angulated, marginal bead broadly crenulate, with spaced long, slender setae; anterior angles obtuse, rounded; posterior angles nearly straight, slightly directed downward. Scutellum 1.8× wider than long, without punctures. Elytron 2.9× longer than wide, densely rugo-punctate, without setae on disk; epipleural border narrowed, extended along the complete margin, provided with very scarce, scattered short setae; humeral calla rounded, prominent; apical calla rounded. Metathoracic wings completely developed. Propygidium shiny, with dense and fine punctuation and numerous short setae toward the basal border. Pygidium convex, shiny, slightly rugose; sparse and deeply punctate, glabrous; apical margin with 11 slender setae; basal margin effaced at the middle. Pterosternon with long, dense yellowish vestiture. Visible abdominal sternites 2° to 4° nearly convex at the midline, sternite 5° convex, with vague patch of microscopic granules at midline and scattered setae at the sides; anal plate slightly concave, vaguely punctate, with anterior border strongly thickened toward the sides, and posterior border narrowly thickened, with shallow and

wide mesial fullow, and 12 scattered setae near the posterior border. Protibiae scarcely shorter than protarsi (0.9:1), with two big teeth and one small tooth on external border, preapical spur long, straight, acute, longer than 2° protarsomerus. Mesotibiae with one oblique, strong, setiferous, transverse carina across external side, and one row of 5 short spines along dorsal border; upper apical spur nearly straight, narrow, 0.7× shorter than lower spur. Metatibiae shorter than metatarsi (0.9:1), with one oblique, strong setiferous transverse carina across external side, and one row of 5 short spines along dorsal border (Fig. 6); apical spurs articulated with the border, upper spur widened before acute apex, slightly curved, longer than 2° metatarsomerus, and 1.3× longer than the lower spur. Tarsomeres semicylindrical, elongated, with enlarged apex, some setae around the apex and two lines of some setae ventrally. Tarsal claws symmetrical, similar on all legs, with median, curvate acute teeth located toward the apex (Fig. 7). Genital capsule with curved, long paramera, fused at their basis, apex widened with acute borders, and with a long, wide and rounded unpaired structure fixed at the middle of the basis. Tectum convex. Aedeagus long, with curved, wide sclerotized tube-like support (Figs. 8 and 9). Length of genital capsule from the apex of parameres to the border of basal piece: 4.2 mm. Total body length: 16.4 mm. Humeral width: 6.9 mm.

Allotype.—Female. Similar to the male except as follows: clypeus and frons slightly more rugose; pygidial shape almost triangular, lateral borders almost triangular, lateral borders almost vertical forming a subconical apical projection; punctuation shallow and dispersed; visible abdominal sternite 5° convex, with scattered setiferous punctures; anal plate convex, punctate, with 10 slender setae near the posterior border. Spines on the dorsal border of meso- and metatibia are larger than in the male. Apical spurs of metatibiae more broad, wide and curved than in the male, with rounded apices. Ventral genital plates strongly sclerotized (except at interior borders when appears almost membranous), slightly symmetrical, convex, smooth, without macroscopic setae; dorsal genital plates not fused, elongated to the apex, with irregular borders, provided with 4–5 short setae on each side (Fig. 10). Total body length: 17.1 mm. Humeral width: 7.3 mm.

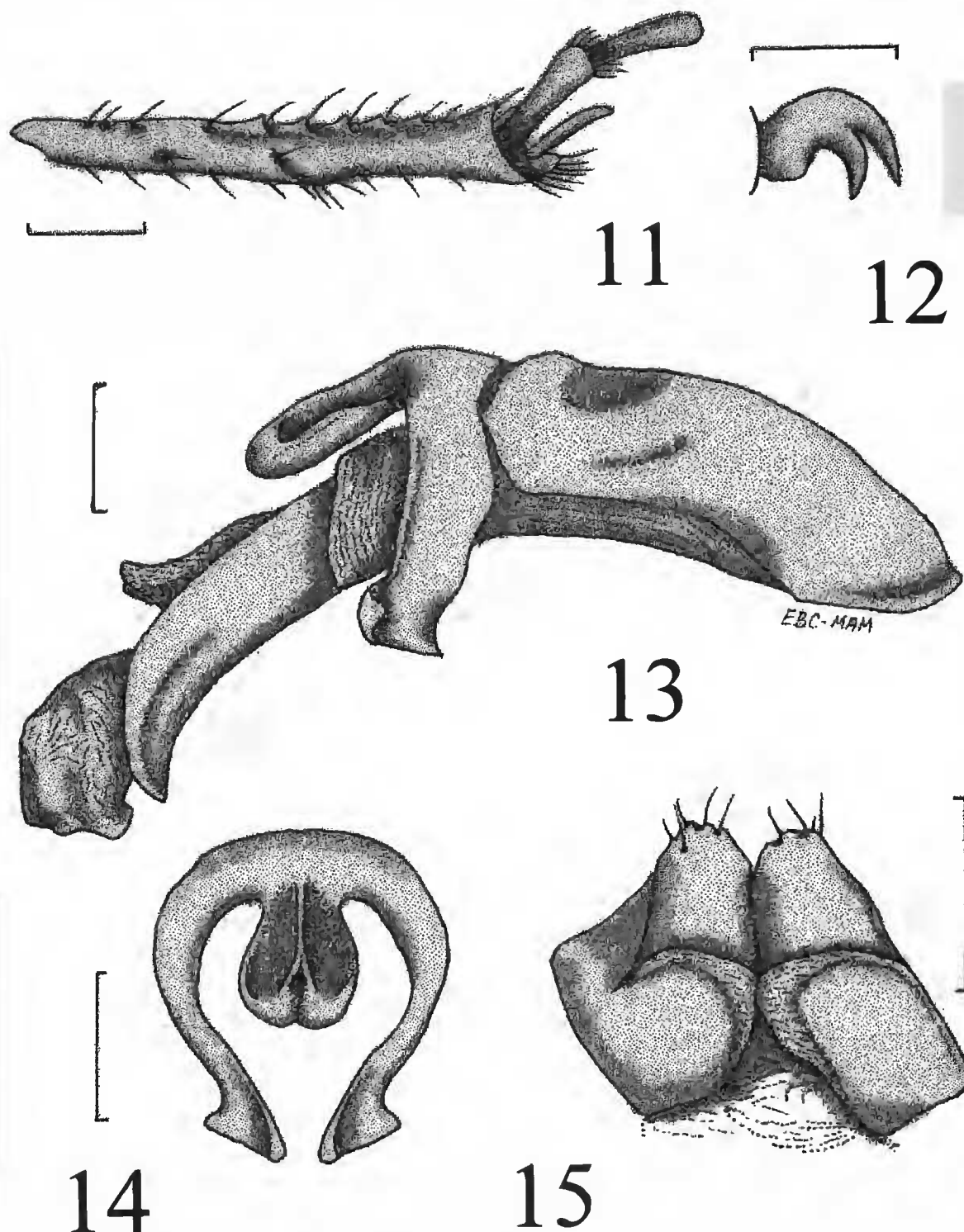
Type locality.—La Unión, department of Zacapa, Guatemala (approx. 14°57' N; 89°15' W).

Variation.—Male paratypes are similar to the holotype except as follows: some specimens are darker and opaque (dark reddish-brown to almost black) or shiny reddish-brown (these specimens also present the genital capsule less sclerotized). Antenna and lamellae dark yellowish-brown in some specimens. Frons with setae longer or shorter than holotype; in some specimens the punctuation are coarser and deeper. Pygidium more densely punctate and less rugose. Total body length 15.5–17.4 mm. Humeral width 6.9–7.4 mm. Female paratypes similar to allotype except in body size: total length 16.6–16.8 mm; humeral width 7.4–7.5 mm.

Biological Data.—Specimens of *P. serratipes* were collected at Hg and UV lights in an isolated cloud forest located at 1350–1500 m altitude, mainly formed by species of *Quercus*, *Clusia*, *Inga* and *Hedyosmum*. This forest is surrounded by coffee plantations and dry forests, dominated by *Pinus*, *Quercus*, *Liquidambar* species at lower altitudes (1300–1450 m). Phenology: May (2), June (2), August (4), September (8). Other species of *Phyllophaga* flying at the same time were *P. (Phytalus) obsoleta* (Blanchard), *P. (Phyllophaga) tenuipilis* (Bates), *P. (P.) setidorsis* (Bates) and *P. (P.) mentalis* Saylor.

Remarks.—*Phyllophaga serratipes* is included in the species group *rostripyga* (*sensu* Cano & Morón 1998), and is related to *P. abcea* Saylor and *P. serrana* sp. nov. Shape of clypeus, sculpture of pygidium and last abdominal segments, structure of mesial projection of the paramera and form of aedeagus support, aid to separate from allied species.

Etymology.—Derived from Latin *serra*, saw shaped, *pes*, *pedis*, a foot, *serratipes*, “saw shaped foot”, (Jaeger 1978) in relation to the serrate edges of the meso- and metatibiae.



Figures 11–15. *Phyllophaga serrana* NEW SPECIES.

Figure 11. Lateral view of male metatibia.

Figure 12. Male protarsal claw.

Figure 13. Lateral view of complete genital capsule of paratype.

Figure 14. Distal view of same paramera.

Figure 15. Female genital plates of allotype. Scale lines = 1 mm, except figure 12 = 0.5 mm.

PHYLLOPHAGA (PHYLLOPHAGA) SERRANA MORÓN & CANO, NEW SPECIES
(Fig. 11–15)

Types.—(Described from 6 males and 2 females). Holotype, male; GUATEMALA: BAJA VERAPAZ, near Purulhá, km 156 on road to Coban, May 1991, P. Hubbell; deposited: Universidad del Valle de Guatemala collection. Allotype, female; same data as holotype; deposited: Universidad del Valle de Guatemala collection. Paratypes: same data as holotype (1 male, 1 female) (UVGC; MXAL). BAJA VERAPAZ, 8 km W on road to Chilascó, 5 Aug 1991, P. Hubbell (4 males) (UVGC; MXAL).

Holotype.—Male. Head and pronotum shiny dark brown, nearly black; elytra, sterna, pygidium and legs shiny reddish dark brown. Clypeus wider than long (2.1:1), anterior border widely sinuated with margins scarcely elevated, surface nearly flattened, with abundant circular punctures, and scattered short, erect setae. Fronto-clypeal suture slightly sinuated, finely impressed. Frons wider than long (2.2:1) convex, coarsely rugo-punctate, with long, slender setae. Antenna 10 segmented, with 3 segmented club; lamellae as long as the length of the six preceding segments combined, segments 4° or 5° longer than segment 3°, segment 7° wider than long, with rounded process directed forward. Frons 5.4× wider than each eye dorsal diameter. Canthus short, curved and rounded, with 7 setae. Labrum deeply bilobed, with numerous slender, stout setae on the borders. Mentum widely concave, polished, with lateral slender setae, anterior border widely notched. Pronotum wider than long (1.9:1) and 2× wider than frons. Pronotal disk with large number of microscopic punctures and numerous round, deep, large punctures separated by 1–3 diameters, each puncture with a long, slender setae; lateral borders strongly angulated, marginal bead regularly crenulate, with long, slender setae; anterior angles obtuse, rounded; posterior angles obtuse, slightly directed downward. Scutellum 1.8× wider than long, without punctures. Elytron 2.9× longer than wide, densely rugo-punctate, with some scattered long setae toward the apical sides; epipleural border narrowed, extended along the complete margin, provided with a fringe of long setae; humeral calla rounded, prominent; apical calla rounded. Metathoracic wings completely developed. Propygidium shiny, densely punctate completely covered with medium size setae. Pygidium convex, shiny, densely rugo-punctate, covered with long erect setae; apical margin with 14 slender setae; basal margin partially effaced at the middle. Pterosternon with long, dense, yellowish vestiture. Visible abdominal sternites 2° to 4° nearly convex at the midline, with dense vestiture of short setae, sternite 5° convex, with transverse sulcus just behind the apical border, completely extended from side to side; anal plate slightly concave, with some setiferous punctures, anterior border noticeably thickened, mainly toward the sides, posterior border narrowly thickened, with 14 scattered, erect setae near the posterior border. Protibiae shorter than protarsi (0.8:1), with two big teeth and one small tooth on external border, preapical spur long, straight, acute, as long as 2° protarsomerus. Mesotibiae with one oblique, strong, setiferous, transverse carina across external side, and one row of 7 short spines along dorsal border; upper apical spur nearly straight, narrowed, 0.9× shorter than lower spur. Metatibiae shorter than metatarsi (0.9:1), with one oblique, strong setiferous transverse carina across external side, and one row of 7 short spines along dorsal border (Fig. 11); apical spurs articulated with the border, upper spur narrowed with acute apex, slightly curved, nearly as long as 2° metatarsomerus, and 1.3× longer than the lower spur. Tarsomeres semicylindrical, elongated, with enlarged apex, some setae around the apex and two lines of setae ventrally. Tarsal claws symmetrical, similar on all legs, with median, curvate acute teeth located toward the apex (Fig. 12). Genital capsule with long paramera, fused at their basis, apex widened and compressed, with a long unpaired recurvated structure fixed at the middle of the basis. Tectum convex. Aedeagus long, with sclerotized support and a pair of dorsal spines before apex (Figs. 13 and 14). Length of genital capsule from the apex of parameres to the border of basal piece: 4.0 mm. Total body length: 16.0 mm. Humeral width: 6.3 mm.

Allotype.—Female. Similar to the male excepts as follows: antennal club narrower than the length of basal segments combined (0.3:1); pygidium semitriangular, more convex toward the apex; punctation and setae scattered, setae short; fifth abdominal sternite convex to almost flattened in the middle; metatibial spurs broadened. Ventral genital plates strongly sclerotized (except at interior borders when appears almost membranous), slightly symmetrical, convex, smooth, without macroscopic setae; dorsal genital plates fused, with apical border sinuated, provided with 6–7 short setae on each side (Fig. 15). Total body length 15.8 mm. Humeral width 5.9 mm.

Type locality.—Purulhá, department Baja Verapaz, Guatemala (approx. 15°16' N; 90°15' W).

Variation.—Male paratypes are similar to the holotype except as follows: some specimens have the pronotum reddish brown, darker and opaque or more reddish and shiny; have more setae on the pronotum, pygidium and abdominal sternites, or the setae of the pronotum are longer. Total body length 12.6–16.3 mm. Humeral width 5.1–6.2 mm. Paratype female similar to allotype except in body size: total length 15.2 mm; humeral width 6.1 mm.

Biological Data.—Specimens of *P. serrana* were collected at light in cloud forest and associated (slightly more dry) forests of *Pinus*, *Quercus* and *Liquid-*

ambar, located between 1500–1600 m of altitude. Phenology: May (3), August (5). Other species of *Phyllophaga* flying at the same time were *P. (Phytalus) obsoleta* (Blanchard), *P. (s. str.) tenuipilis* (Bates) and *P. (s. str.) rugipennis* (Schauffus).

Remarks.—*Phyllophaga serrana* is included in the species group *rostripyga* (*sensu* Cano & Morón 1998), and is related to *P. abcea* Saylor and *P. serratipes* sp. nov. Shape of clypeus, pronotal and sternite vestiture, sculpture of pygidium and last abdominal segments, structure of paramera and aedeagus aid to separate from allied species.

Etymology.—Derived from the name applied to the area where this species was collected, “Serrana Area”, according with the Biotic Areas System of Guatemala (modified from Stuart 1942).

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